WHAT IS CLAIMED IS:

1. A method for detecting a symbol comprising:

receiving an estimated frequency error;

calculating a vector based on the estimated frequency error;

rotating buffered symbols of a first and second type via the vector;

estimating a channel gain for the buffered symbols of the second type;

applying the channel gain to the rotated buffered symbols of the second type; and

summing the results of the application.

2. The method of claim 1, wherein the symbols of the first type are common paging channel (CPICH) symbols and the symbols of the second type are paging indicator (PICH) symbols.

3. The method of claim 2, wherein a paging indicator may comprise a plurality of paging indicator symbols.

4. The method of claim 1 further comprising before the receiving:

buffering symbols of the first type; and

buffering symbols of the second type as they are detected.

5. The method of claim 4, wherein an integer number of transmission slots of symbols of the first type are buffered.

6. The method of claim 5, wherein the integer number is three (3).

7. The method of claim 4, wherein the number of symbols of the first type spans a time span that is greater than a time span covered by the number of symbols of the second type that are buffered.

8. The method of claim 7, wherein the number of symbols of the second type buffered is twelve (12).

9. The method of claim 1 wherein the estimated frequency error can be determined from an i-th symbol of the first type based on a mathematical expression as follows:

$$\begin{aligned} y_c(i) &= \hat{h}(i)e^{j(2\pi f_e iT_s+\theta_0)} + n_c(i) \\ &= \hat{h}(i)e^{j\theta_0}e^{j2\pi f_e iT_s} + n_c(i) \\ &= h(i)e^{j2\pi f_e iT_s} + n_c(i) \end{aligned}$$

wherein $\hat{h}(i)$ can represent all except the phase terms due to the phase error and the initial phase term θ_0 due to the zero phase reference point, $h(i)$ includes all except the phase terms due to the frequency error, $n_c(i)$ includes all noise terms, T_s represents the symbols length of one CPICH symbol, and $\hat{f}_e$ is the estimated frequency error.

10. The method of claim 1 wherein the estimated frequency error can be determined from an i-th symbol of the second type based on a mathematical expression as follows:

$$\begin{aligned} y_p(i) &= \hat{g}(i)e^{j(2\pi f_e(M+i)T_s+\theta_0)} + n_p(i) \\ &= \hat{g}(i)e^{j\theta_0}e^{j2\pi f_e(i+M)T_s} + n_p(i) \\ &= g(i)e^{j2\pi f_e(i+M)T_s} + n_p(i) \end{aligned}$$

wherein $\hat{g}(i)$ represents all except the phase terms due to the phase error and the initial phase

term θ_0, $g(i)$ includes all except the phase terms due to the frequency error, $n_p(i)$ includes all noise terms, and $\hat{f}_e$ is the estimated frequency error.

11. The method of claim 1 wherein the result of the summing is a decoded paging indicator.

12. The method of claim 1, wherein the symbols of the first and second types are transmitted over-the-air, wherein multipath reception of the symbols exists, and the method further comprising:

repeating the rotating, estimating, applying, and summing for each path in the multipath; and

combining the summed results for each path in the multipath.

13. The method of claim 12, wherein the combined result is a decoded paging indicator.

14. The method of claim 1, wherein two vectors are calculated, with one vector for each symbol type.

15. The method of claim 14, wherein a first vector for use with symbols of the first type can be computed from the estimated frequency error using the following expression:

$$\mathbf{w}_c = \begin{bmatrix} 1 & e^{-j2\pi \hat{f}_e T_s} & \cdots & e^{-j2\pi \hat{f}_e (2M+Q-1)T_s} \end{bmatrix}_{(2M+Q)\times 1}$$

wherein $\hat{f}_e$ is the estimated frequency error, Q is the number of symbols of the second type buffered, and $2M+Q$ is the number of symbols of the first type buffered.

16. The method of claim 14, wherein a second vector for use with symbols of the second type can be computed from the estimated frequency error using the following expression:

$$\mathbf{w}_p = \left[e^{-j2\pi \hat{f}_e M T_s} \quad e^{-j2\pi \hat{f}_e (M+1) T_s} \quad \cdots \quad e^{-j2\pi \hat{f}_e (M+Q) T_s} \right]_{Q\times 1}$$

wherein $\hat{f}_e$ is the estimated frequency error, Q is the number of symbols of the second type buffered, and $2M+Q$ is the number of symbols of the first type buffered.

17. The method of claim 1, wherein the estimating comprises multiplying the vector with the buffered symbols of the first type.

18. The method of 17, wherein the channel estimate for an i-th buffered symbol of the first type can be expressed as:

$$u(i) = \sum_{m=0}^{2M} \mathbf{w}_c(m) y_c(m+i) = \sum_{m=0}^{2M} \hat{y}_c(m+i)$$

wherein $y_c(m)$ is the m-th buffered symbol of the first type and $w_c(m)$ is the m-th term of the vector, and $2M$ is the number of buffered symbols of the first type.

19. The method of claim 1, wherein the applying comprises multiplying the estimated channel gain with each buffered symbol of the second type after being rotated.

20. The method of claim 1, wherein the summing comprises summing the result of the multiplication of the estimated channel gain with each buffered symbol of the second type, with the summing expressible as:

$$z = \sum_{q=0}^{Q-1} u(q)^* \hat{y}_p(q)$$

wherein $u(m)$ is the m-th term of the estimated channel gain, $\hat{y}_p(m)$ is the m-th buffered symbol of the second type after being rotated, and Q is the number of buffered symbols of the second type.

21. A symbol detector comprising:

a first and a second symbol buffer coupled to a symbol input;

a frequency error estimator (FES) unit coupled to the first and second buffers, the FES unit containing circuitry to compute a frequency error estimate from the symbols in the first and second buffers;

a phase vector generator coupled to the FES unit, the phase vector generator containing circuitry to compute a phase rotation vector based on the frequency error estimate;

a first phase error corrector coupled to the first symbol buffer and the phase vector generator, the first phase error corrector containing circuitry to rotate the symbols in the first symbol buffer; and

a second phase error corrector coupled to the second symbol buffer and the phase vector generator, the second phase error corrector containing circuitry to rotate the symbols in the second symbol buffer, compute a channel gain for each symbol in the second symbol buffer, and apply the channel gain to the rotated symbols from the second symbol buffer.

22. The symbol detector of claim 21 further comprising a channel estimator coupled to the first and the second phase error correctors, the channel estimator containing circuitry to combine the rotated symbols from the second symbol buffer after the application of the channel gain.

23. The symbol detector of claim 22, wherein the symbols in the first symbol buffer are paging channel symbols and the symbols in the second symbol buffer are paging indicator symbols, and wherein the channel estimator produces a decoded paging indicator.

24. A wireless device comprising:

a radio frequency (RF) signal input;

a symbol detector coupled to the RF signal input, the symbol detector containing circuitry to calculate a frequency error estimate based upon symbols from the RF signal input and to correct frequency errors in symbols from the RF signal input using the calculated frequency error estimate via mathematical manipulations; and

a combiner coupled to the symbol detector, the combiner containing circuitry to merge output from the symbol detector based on a weight assigned to the output.

25. The wireless device of claim 24 further comprising a demodulator and decoder coupled to the combiner, the demodulator and decoder containing circuitry to remove spreading codes applied to the symbols from the RF signal input prior to their transmission and to produce digital data.

26. The wireless device of claim 24, wherein the symbol detector comprises:

a first and a second symbol buffer coupled to the RF signal input;

a frequency error estimator (FES) unit coupled to the first and second buffers, the FES unit containing circuitry to compute a frequency error estimate from the symbols in the first and second buffers;

a phase vector generator coupled to the FES unit, the phase vector generator containing circuitry to compute a phase rotation vector based on the frequency error estimate;

a first phase error corrector coupled to the first symbol buffer and the phase vector generator, the first phase error corrector containing circuitry to rotate the symbols in the first symbol buffer; and

a second phase error corrector coupled to the second symbol buffer and the phase vector

generator, the second phase error corrector containing circuitry to rotate the symbols in the second symbol buffer, compute a channel gain for each symbol in the second symbol buffer, and apply the channel gain to the rotated symbols from the second symbol buffer.

27. The wireless device of claim 24, wherein the wireless device operates in a wireless communications network that uses paging indicators to inform wireless devices of incoming calls.

28. The wireless device of claim 27, wherein the wireless communications network is a 3rd Generation Partnership Project (3GPP) compliant network.

29. The wireless device of claim 27, wherein the wireless communications network is a CDMA2000 compliant network.